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Draft Data Summary Report for IHSS Group 500-5 PAC 500-904

April 2004

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for IHSS Group 500-5
PAC 500-904

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Approval received from the Colorado Department of Public Health and Environment

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Approval letter contained in the Administrative Record

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ACRONYMS

AL	action level
CAS	Chemical Abstracts Service
CDD	chlorodibenzo-p-dioxin
CDF	chlorodibenzofuran
CDPHE	Colorado Department of Public Health and Environment
COC	contaminant of concern
DOE	U S Department of Energy
DQA	Data Quality Assessment
DQO	data quality objective
EPA	U S Environmental Protection Agency
ft	foot
FY	Fiscal Year
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
K-H	Kaiser-Hill Company, L L C
LCS	laboratory control sample
ug/kg	microgram per kilogram
ug/L	microgram per liter
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NFAA	No Further Accelerated Action
PAC	Potential Area of Concern
PARCCS	precision, accuracy, representativeness, completeness, comparability and sensitivity
PCB	polychlorinated biphenyl
pCi/g	picocurie per gram
pg/g	picogram per gram
ppm	part per million
QC	quality control
RFCA	Rocky Flats Cleanup Agreement
RFETS or Site	Rocky Flats Environmental Technology Site
RL	reporting limit
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SOR	sum of ratios
SSRS	Subsurface Soil Risk Screen
SWD	Soil Water Database
TEF	toxicity equivalency factor
TEQ	toxicity equivalent
V&V	verification and validation
WRW	wildlife refuge worker

1.0 INTRODUCTION

This Data Summary Report summarizes the accelerated action characterization conducted at Individual Hazardous Substance Site (IHSS) Group 500-5 at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden, Colorado This IHSS Group consists of one Potential Area of Concern (PAC)

- PAC 500-904, Transformer Leak 223-1/223-2

The locations of IHSS Group 500-5 and PAC 500-904 are shown on Figure 1

Accelerated action characterization was planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001) and IASAP Addendum #IA-04-03 (DOE 2003) Results are compared to wildlife refuge worker (WRW) action levels (ALs) described in the Rocky Flats Cleanup Agreement (RFCA) Modification (DOE et al 2003) Potential ecological risk associated with the results will be evaluated in the Accelerated Action Ecological Screening Evaluation and the ecological portion of the Sitewide Comprehensive Risk Assessment

Approval of this Data Summary Report constitutes regulatory agency concurrence that this IHSS Group is a No Further Accelerated Action (NFAA) site This information and NFAA determination will be documented in the Fiscal Year (FY) 2004 Historical Release Report (HRR)

2.0 SITE CHARACTERIZATION

IHSS Group 500-5 characterization information consists of historical knowledge (DOE 1992-2003, 2000, 2001), historical sampling data, and recent sampling data Historical information and data are summarized in Section 2 1 Characterization data collected in accordance with IASAP Addendum #IA-04-03 are presented in Section 2 2

2.1 Historical Information and Data

Transformers 223-1 and 223-2 leaked small amounts of oil prior to 1987 (DOE 2001) In February 1986, the valve, tap changer, and bushings of Transformer 223-1 were reported leaking, and in January 1987, residual staining was noted on the concrete pad underlying Transformer 223-2 Analytical data from approximately 1985 indicated that the oil in Transformer 223-1 contained more than 500 parts per million (ppm) polychlorinated biphenyls (PCBs) and that the oil in Transformer 223-2 contained less than 50 ppm PCBs In October and November 1985, it was reported that fluid in Transformers 223-1 and 223-2 contained 19,800 and 296 ppm PCBs, respectively In November 1986, a smear sample collected from the concrete underlying the drain valve of Transformer 223-1 indicated less than 50 micrograms per liter (ug/L) of PCBs Reportedly, the transformers were retrofilled with non-PCB cooling oil in 1987, and Transformer 223-1 was reportedly replaced in March 1989 Sometime during the 1990s, non-PCB oil from the western transformer was released to the environment, probably due to overfilling the oil reservoir, resulting in an oil stain in the soil north of the pad Both transformers have since been removed from their concrete pads (only the pads remain)

Historical soil sampling locations and analytical results are presented on Figure 2 Only surface soil samples were collected (1991), and only results greater than background means plus two standard deviations or method detection limits (MDLs) are shown The soil data indicated that at two locations concentrations of Aroclor-1254 exceeded the RFCA WRW AL These data were used to determine accelerated action sampling locations and requirements

2.2 Accelerated Action Characterization Data

Sampling specifications associated with the acceleration action characterization are described in IASAP Addendum #IA-04-03 (DOE 2003) and summarized in Table 1 Deviations from the IASAP Addendum are also presented and explained in Table 1 Actual sampling coordinates were different than planned coordinates, because planned coordinates were based on the incorrect location of the PAC on the Site map Actual coordinates were measured in the field based on the actual location of the transformer pads The location of the PAC will be adjusted in FY04 and documented in the FY04 HRR Also, sample depths for the second sample interval at the four locations around the western transformer were less than planned because of sampling refusal Actual sample media and analytes were the same as planned

A summary of planned and actual sampling and analysis is presented in Table 2 All planned samples were collected and analyzed for PCBs Dioxins and furans were analyzed for in the samples collected from Sampling Location CB43-038, not from Sampling Location CB43-037 as planned, because Sampling Location CB43-038 had the highest historical concentration of PCBs (Historical Sampling Location PCB-2-6) (refer to Section 2 1, Figure 2) This was discussed with the Colorado Department of Public Health and Environment (CDPHE) prior to sampling, and concurrence was obtained

Accelerated action soil sampling locations and analytical results for IHSS Group 500-5 are summarized on Figure 3 and in Table 3 Only results greater than background means plus two standard deviations or reporting limits (RLs) are shown Data show that all contaminant concentrations are less than RFCA WRW ALs The data, retrieved from the RFETS Soil Water Database (SWD) on April 12, 2004, are provided on the enclosed compact disc The compact disc contains normalized real and quality control (QC) data, (Chemical Abstracts Service [CAS] numbers, analyte names, and units)

Because there are no existing RFCA ALs for dioxin and furan congeners, a different framework was used for comparison of analytical results (in accordance with RFCA) Results for dioxin and furan congeners were converted to toxicity equivalents (TEQs) using toxicity equivalency factors (TEFs) in accordance with SW8290 (EPA 1994a) and a World Health Organization study (1998) The TEF for each dioxin and furan congener is presented in Table 4 Then the TEQ values for dioxin congeners were summed for each sampling location, the TEQ values for furan congeners were summed for each sampling location, and the two values were summed for each location (Table 5) The summed TEQs for both sampling locations do not exceed the U S Environmental Protection Agency (EPA) Residential Cleanup Guidance of 1,000 picograms per gram (pg/g) (EPA 1998a) Values are also well within the cited Front Range background range of 0 1 to 57 5 pg/g (EPA 2001)

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Table 1
Deviations from IASAP Addendum #IA-04-03

Location Code	Proposed Easting	Proposed Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analyte	Comment
CA43-012	2082922 896	750004 472	2082886 360	750006 870	Surface & Subsurface Soil	0 0 - 0 5 0 5 – 1 8	PCBs	Biased location adjacent to pad, moved 37 ft west and 2 ft north to match actual location of pad B interval shortened due to sampling refusal
CA43-013	2082915 915	750011 149	2082882 050	750010 030	Surface & Subsurface Soil	0 0 - 0 5 0 5 - 2 3	PCBs	Biased location adjacent to pad, moved 34 ft west and 1 ft south to match actual location of pad B interval shortened due to sampling refusal
CA43-014	2082909 263	750004 734	2082877 250	750005 920	Surface & Subsurface Soil	0 0 - 0 5 0 5 – 1 8	PCBs	Biased location adjacent to pad, moved 32 ft west and 1 ft north to match actual location of pad B interval shortened due to sampling refusal
CA43-015	2082916 153	749997 131	2082881 820	750000 850	Surface & Subsurface Soil	0 0 - 0 5 0 5 – 1 8	PCBs	Biased location adjacent to pad, moved 34 ft west and 4 ft north to match actual location of pad B interval shortened due to sampling refusal
CB43-036	2082943 952	750011 149	2082899 583	750010 099	Surface & Subsurface Soil	0 0 - 0 5 0 5 - 2 5	PCBs	Biased location adjacent to pad, moved 44 ft west and 1 ft south to match actual location of pad
CB43-037	2082952 267	750004 971	2082904 536	750008 024	Surface & Subsurface Soil	0 0 - 0 5 0 5 - 2 5	PCBs	Biased location adjacent to pad, moved 47 ft west and 3 ft north to match actual location of pad Sample not analyzed for dioxins/furans as planned, another location selected for dioxin/furan analysis, see comment for CB43-038
CB43-038	2082944 189	749997 131	2082899 151	750005 264	Surface & Subsurface Soil	0 0 - 0 5 0 5 - 2 5	PCBs Dioxins Furans	Biased location adjacent to pad, moved 45 ft west and 8 ft north to match actual location of pad Sample analyzed for dioxins/furans because this location had the highest historical concentration of PCBs (Historical Sampling Location PCB-2-6) (Section 2 2)
CB43-039	2082937 536	750003 783	2082893 915	750007 618	Surface & Subsurface Soil	0 0 - 0 5 0 5 - 2 5	PCBs	Biased location adjacent to pad, moved 44 ft west and 4 ft north to match actual location of pad

Table 2
IHSS Group 500-5 Sampling and Analysis Summary

Category	Planned Total	Actual Total
Number of Sampling Locations	8	8
Number of Samples	16	16
Number of PCB Analyses	16	16
Number of Dioxin/Furan Analyses	2	2

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Table 3
IHSS Group 500-5 Accelerated Action Characterization Data

Location Code	Latitude	Longitude	Start Depth (ft)	End Depth (ft)	Analyte	Result	Unit	RL	WRW AL
PCBs									
CA43-012	750006 870	2082886 360	0 0	0 5	Aroclor-1260	33 000	ug/kg	6 600	12400 0
CA43-012	750006 870	2082886 360	0 5	1 8	Aroclor-1260	9 600	ug/kg	6 300	12400 0
CA43-013	750010 030	2082882 050	0 0	0 5	Aroclor-1260	260 000	ug/kg	6 900	12400 0
CA43-013	750010 030	2082882 050	0 5	2 3	Aroclor-1260	130 000	ug/kg	6 700	12400 0
CA43-014	750005 920	2082877 250	0 0	0 5	Aroclor-1260	24 000	ug/kg	6 800	12400 0
CA43-015	750000 850	2082881 820	0 0	0 5	Aroclor-1260	360 000	ug/kg	6 700	12400 0
CA43-015	750000 850	2082881 820	0 5	1 8	Aroclor-1260	470 000	ug/kg	33 000	12400 0
CB43-036	750010 099	2082899 583	0 0	0 5	Aroclor-1260	260 000	ug/kg	6 700	12400 0
CB43-036	750010 099	2082899 583	0 5	2 5	Aroclor-1260	300 000	ug/kg	6 600	12400 0
CB43-037	750008 024	2082904 536	0 0	0 5	Aroclor-1260	2300 000	ug/kg	130 000	12400 0
CB43-037	750008 024	2082904 536	0 5	2 5	Aroclor-1260	34 000	ug/kg	6 700	12400 0
CB43-038	750005 264	2082899 151	0 0	0 5	Aroclor-1260	2200 000	ug/kg	130 000	12400 0
CB43-038	750005 264	2082899 151	0 5	2 5	Aroclor-1260	50 000	ug/kg	6 400	12400 0
CB43-039	750007 618	2082893 915	0 0	0 5	Aroclor-1260	270 000	ug/kg	6 500	12400 0
CB43-039	750007 618	2082893 915	0 5	2 5	Aroclor-1260	93 000	ug/kg	6 900	12400 0
Dioxins and Furans									
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	64 600	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	15 900	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	1 860	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	1 430	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	16 800	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	4 310	pg/g	1 080	N/A

Location Code	Latitude	Longitude	Start Depth (ft)	End Depth (ft)	Analyte	Result	Unit	RL	WRW Flag
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	6 270	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	2 850	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	11 100	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	2 590	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	17 900	pg/g	1 080	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	2,3,7,8- Tetrachlorodibenzofuran (TCDF)	49 6	pg/g	0 432	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	408 000	pg/g	2 160	N/A
CB43-038	750005 264	2082899 151	0 0	0 5	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	17 300	pg/g	2 160	N/A
CB43-038	750005 264	2082899 151	0 5	2 5	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	14 900	pg/g	1 100	N/A
CB43-038	750005 264	2082899 151	0 5	2 5	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	3 160	pg/g	1 100	N/A
CB43-038	750005 264	2082899 151	0 5	2 5	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	3 000	pg/g	1 100	N/A
CB43-038	750005 264	2082899 151	0 5	2 5	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	3 270	pg/g	1 100	N/A
CB43-038	750005 264	2082899 151	0 5	2 5	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	2 470	pg/g	1 100	N/A
CB43-038	750005 264	2082899 151	0 5	2 5	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	10 200	pg/g	0 439	N/A
CB43-038	750005 264	2082899 151	0 5	2 5	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	83 700	pg/g	2 200	N/A
CB43-038	750005 264	2082899 151	0 5	2 5	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	4 250	pg/g	2 200	N/A

Table 4
IHSS Group 500-5 TEQ Comparison

Analyte	TEF
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0 01
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0 01
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0 01
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0 10
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0 10
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0 10
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0 10
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0 10
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0 10
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1 00
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0 05
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0 10
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0 50
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0 10
2,3,7,8,-Tetrachlorodibenzodioxin (TCDD)	1
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	0 0001
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0 0001

Table 5
IHSS Group 500-5 Summed TEQs by Sampling Location

Sampling Location	Sample Depth (ft)	Summed CDD TEQs (pg/g)	Summed CDF TEQs (pg/g)	Summed CDD and CDF TEQs (pg/g)
CB43-038	0 0 – 0 5	1 54	17 21	18 75
CB43-038	0 5 – 2 5	0 16	2 75	2 91

2.3 Sums of Ratios

RFCA sums of ratios (SORs) were calculated for the IHSS Group 500-5 sampling locations based on the accelerated action analytical data for the contaminants of concern (COCs) and the WRW ALs Only surface soil SORs for the non-radionuclides of concern were calculated SORs for non-radionuclides were calculated for all locations where analyte concentrations were detected at 10 percent or more of a contaminant's WRW AL SORs for non-radionuclides are presented in Table 6 As shown, all SORs for non-radionuclides in surface soil are less than 1 Subsurface soil SORs for non-radionuclides were not calculated because subsurface soil concentrations are evaluated as part of the Subsurface Soil Risk Screen (SSRS) in Section 3 0 SORs for radionuclides were not calculated because radionuclides are not COCs for this IHSS Group

Table 6
IHSS Group 500-5 Non-Radionuclide Surface Soil SORs

Location Code	SOR to WRW
CB43-037	0 185
CB43-038	0 177

2.4 Summary Statistics

Table 7 provides summary statistics calculated by analyte for IHSS Group 500-5 surface and subsurface soil sampling locations Only detected analytes with WRW ALs are included

Table 7
IHSS Group 500-5 Surface and Subsurface Soil Summary Statistics

Analyte	Medium	Total Number of Samples Analyzed	Detection Frequency (%)	Average Concentration	Maximum Concentration	SS WRW AL	Units
Aroclor-1260	Surface Soil	8	100 0	713 375	2300	12400	ug/kg
Aroclor-1260	Subsurface Soil	8	87 5	155 229	470	12400	ug/kg

3.0 SUBSURFACE SOIL RISK SCREEN

This SSRS follows the steps identified on Figure 3 in Attachment 5 of the RFCA Modification (DOE et al 2003)

Screen 1 – Are the COC concentrations below RFCA Table 3 soil ALs for the WRW?

Yes, COC concentrations are less than the soil WRW ALs

Screen 2 – Is there a potential for subsurface soil to become surface soil (landslides and erosion areas identified on Figure 1 of the RFCA Modification)?

No PAC 500-904 is not located in an area susceptible to landslides or high erosion (Figure 1) (DOE et al 2003)

Screen 3 – Does subsurface soil contamination for radionuclides exceed criteria defined in RFCA Section 5 3 and Attachment 14?

No Radionuclides are not a COC at IHSS Group 500-5 Because Original Process Waste Lines are not part of IHSS Group 500-5, RFCA Attachment 14 does not apply

Screen 4 – Is there an environmental pathway and sufficient quantity of COCs that would cause an exceedance of surface water standards?

Contaminant migration via erosion and groundwater are the two possible pathways whereby surface water could become contaminated from PAC 500-904 soil However, as stated above, COC concentrations are less than the soil WRW ALs, and erosion is not significant at IHSS Group 500-5 In addition, in general, PCBs and related contaminants in soil are not mobile and do not migrate to surface water or groundwater Based on historical Site data, PCBs and related contaminants are not considered COCs for surface water and groundwater

4.0 NO LONGER REPRESENTATIVE SAMPLING LOCATIONS

The two transformer pads and the oil-stained soil north of the western pad will be removed during May 2004 as an IHSS Group 500-5 best management practice (refer to ER Regulatory Contact Record dated April 20, 2004, in Appendix A) In addition, a third

pad in the area, which contained a non-PCB transformer and is not part of this or any PAC, will be removed at the same time This removal will disturb the six historical sampling locations, shown on Figure 2, as well as Accelerated Action Sampling Location CA43-013, shown on Figure 3 The six historical sampling locations include Sampling Locations PCB-2-1, PCB-2-2, PCB-2-3, PCB-2-4, PCB-2-5 and PCB-2-6 These locations were only for surface soil samples Sampling Location CA43-013 was for a surface sample and a subsurface sample Both sampling intervals will be disturbed when the oil-stained soil was removed All seven of these locations will be considered no longer representative

5.0 NFAA SUMMARY

Based on the accelerated action characterization results and the SSRS, action is not required and an NFAA determination for IHSS Group 500-5 is justified Justification is based on the following

- All PCB concentrations in surface soil are less than the WRW ALs,
- Migration of contaminants to surface water through erosion is unlikely because the IHSS Group is not in an area prone to erosion and landslides, and
- In general, PCBs in soil are not mobile and do not migrate to surface or ground water

6.0 DATA QUALITY ASSESSMENT

The data quality objectives (DQOs) for this project are described in the IASAP (DOE 2001) All DQOs for this project were achieved based on the following

- Regulatory agency-approved sampling program design (IASAP Addendum #IA-04-03 [DOE 2003]), modified, due to field conditions, in accordance with the IASAP (DOE 2001),
- Collection of samples in accordance with the sampling design, and
- Results of the Data Quality Assessment (DQA), as described in the following sections

6.1 Data Quality Assessment Process

The DQA process ensures that the type, quantity and quality of environmental data used in decision making are defensible, and is based on the following guidance and requirements

- EPA, 1994b, Guidance for the Data Quality Objective Process, QA/G-4,
- EPA, 1998b, Guidance for the Data Quality Assessment Process, Practical Methods for Data Analysis, QA/G-9, and
- DOE, 1999, Order 414 1A, Quality Assurance

Verification and validation (V&V) of data are the primary components of the DQA The final data are compared with original project DQOs and evaluated with respect to project decisions, uncertainty within the decisions, and quality criteria required for the data, specifically precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) Validation criteria are consistent with the following RFETS-specific documents and industry guidelines

- EPA, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, 540/R-94/012,
- EPA, 1994d, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, 540/R-94/013,
- K-H, 2002a, General Guidelines for Data Verification and Validation, DA-GR01-v2, October,
- K-H, 2002b, V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v2, October,
- K-H, 2002c, V&V Guidelines for Volatile Organics, DA-SS01-v3, October,
- K-H, 2002d, V&V Guidelines for Semivolatile Organics, DA-SS02-v3, October,
- K-H, 2002e, V&V Guidelines for Metals, DA-SS05-v3, October, and
- Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5

This report will be submitted to the Comprehensive Environmental Response, Compensation, and Liability Act Administrative Record for permanent storage 30 days after being provided to CDPHE and/or EPA

6.2 Verification and Validation of Results

Verification ensures that data produced and used by the project are documented and traceable in accordance with quality requirements Validation consists of a technical review of all data that directly support the project decisions so that any limitations of the data relative to project goals are delineated and the associated data are qualified The V&V process defines the criteria that constitute data quality, namely PARCCS parameters Data traceability and archival are also addressed V&V criteria include the following

- Chain-of-custody,
- Preservation and hold times,
- Instrument calibrations,
- Preparation blanks,
- Interference check samples (metals),
- Matrix spikes/matrix spike duplicates (MS/MSDs),
- Laboratory control samples (LCSs),

- Field duplicate measurements,
- Chemical yield (radiochemistry),
- Required quantitation limits/minimum detectable activities (sensitivity of chemical and radiochemical measurements, respectively), and
- Sample analysis and preparation methods

Evaluation of V&V criteria ensures that PARCCS parameters are satisfactory (i e , within tolerances acceptable to the project) Satisfactory V&V of laboratory quality controls are captured through application of validation "flags" or qualifiers to individual records

Raw hard-copy data (for example, individual analytical data packages) are currently filed by report identification number and maintained by K-H Analytical Services Division Older hard copies may reside in the Federal Center in Lakewood, Colorado Electronic data are stored in the RFETS SWD

Normalized real and QC data are included on the enclosed compact disc

6.2.1 Accuracy

The following measures of accuracy were reviewed

- LCS evaluation,
- Surrogate evaluation,
- Field blank evaluation, and
- Sample MS evaluation

Results are compared to method requirements and project goals The results of these comparisons are summarized for RFCA COCs where the result could impact project decisions Particular attention is paid to those values near ALs when QC results could indicate unacceptable levels of uncertainty for decision-making purposes

Laboratory Control Sample Evaluation

The frequency of LCS measurements, relative to each laboratory batch, is given in Table 8 LCS frequency was adequate based on at least one LCS per batch The minimum and maximum LCS results are also tabulated, by chemical, for the project Recoveries were within the upper and lower limits, indicating the laboratory was not introducing a bias in the results

Table 8
LCS Evaluation Summary

Test Method	CAS No.	Analyte	Min Result	Max Result	Result Unit	No. of Analytes	No. of Batches
SW-846 8082	12674-11-2	Aroclor-1016	85	85	% recovery	1	1
SW-846 8082	11096-82-5	Aroclor-1260	96	96	% recovery	1	1

Surrogate Evaluation

Volatile organic compounds and semi-volatile organic compounds were not analyzed for as part of this accelerated action characterization, and therefore, surrogate recoveries were not evaluated

Field Blank Evaluation

Results of the field blank analyses are given in Table 9 No contaminants were detected within the blanks, indicating no cross-contamination of samples occurred

Table 9
Field Blank Summary

Test Method	CAS No.	Analyte	Sample QC Code	Max Result	Result Unit	Lab Results Qualifier Code
SW-846 8082	12674-11-2	Aroclor-1016	FB	0 5	ug/L	U
SW-846 8082	12674-11-2	Aroclor-1016	RNS	0 5	ug/L	U
SW-846 8082	11104-28-2	Aroclor-1221	FB	0 5	ug/L	U
SW-846 8082	11104-28-2	Aroclor-1221	RNS	0 5	ug/L	U
SW-846 8082	11141-16-5	Aroclor-1232	FB	0 5	ug/L	U
SW-846 8082	11141-16-5	Aroclor-1232	RNS	0 5	ug/L	U
SW-846 8082	53469-21-9	Aroclor-1242	FB	0 5	ug/L	U
SW-846 8082	53469-21-9	Aroclor-1242	RNS	0 5	ug/L	U
SW-846 8082	12672-29-6	Aroclor-1248	FB	0 5	ug/L	U
SW-846 8082	12672-29-6	Aroclor-1248	RNS	0 5	ug/L	U
SW-846 8082	11097-69-1	Aroclor-1254	FB	0 5	ug/L	U
SW-846 8082	11097-69-1	Aroclor-1254	RNS	0 5	ug/L	U
SW-846 8082	11096-82-5	Aroclor-1260	FB	0 5	ug/L	U
SW-846 8082	11096-82-5	Aroclor-1260	RNS	0 5	ug/L	U

Field blank (TB = trip, RNS = rinse, FB = field) results greater than detection limits (not U-qualified)

Sample Matrix Spike Evaluation

The frequency of MS measurements, relative to each laboratory batch, was adequate based on at least one MS per batch The minimum and maximum MS recovery results are summarized, by chemical, for the project in Table 10 Recoveries were acceptable

Table 10
Sample MS Evaluation Summary

Test Method	CAS No.	Analyte	Min Result	Max Result	Result Unit	No. of Samples	No. of Lab Batches
SW-846 8082	12674-11-2	Aroclor-1016	76	76	% recovery	1	1
SW-846 8082	11096-82-5	Aroclor-1260	88	88	% recovery	1	1

6.2.2 Precision

Matrix Spike Duplicate Evaluation

Laboratory precision is measured through use of MSDs Adequate frequency of MSD measurements is indicated by at least one MSD in each laboratory batch, as shown in Table 11 In addition, the relative percent differences (RPDs) were low (less than 35), and therefore, no data were rejected

Table 11
Sample MSD Evaluation Summary

Test Method	CAS No.	Analyte	No. of Sample Pairs	No. of Lab Batches	Max RPD
SW-846 8082	12674-11-2	Aroclor-1016	1	1	2 67
SW-846 8082	11096-82-5	Aroclor-1260	1	1	8 28

Field Duplicate Evaluation

Field duplicate results reflect sampling precision, or overall repeatability of the sampling process The frequency of field duplicate collection should exceed 1 field duplicate per 20 real samples, or 5 percent Table 12 indicates that field duplicate frequencies for this project were adequate with respect to all test methods

The RPDs indicate how much variation exists in the field duplicate analyses EPA data validation guidelines state that "there are no required review criteria for field duplicate analyses comparability" (EPA 1994c) For the DQA, the highest maximum RPDs were reviewed The highest sample amounts for those analytes were corrected for the associated RPDs (Table 13), and the resulting numbers were compared to the ALs For this project, all corrected concentration values were less than the ALs

Table 12
Field Duplicate Sample Frequency Summary

Test Method	Sample Code	Number of Samples	% Duplicate Samples
SW-846 8082	REAL	16	12 50
SW-846 8082	DUP	2	

Table 13
RPD Evaluation Summary

Laboratory	Analyte	Max Result RPD
ESTLDEN	Aroclor-1221	2 74
ESTLDEN	Aroclor-1232	181 68
ESTLDEN	Aroclor-1242	181 68
ESTLDEN	Aroclor-1254	181 68
ESTLDEN	Aroclor-1260	189 74

6.2.3 Completeness

Based on original project DQOs, a minimum of 25 percent of Environmental Restoration Program analytical (and radiological) results must be formally verified and validated Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements Table 14 shows the number and percentage of validated records, the number and percentage of verified records, and the percentage of rejected records for each analyte group for this project For this project, the percentages of analyses validated meet Program requirements

Table 14
Validation and Verification Summary

Validation Qualifier Code	Top for OAS Numbers	SW846 8330 Results
J	1	1
V	111	111
Total	112	112
Validated	112	112
% Validated	100 00	100 00
Verified	112	112
% Verified	100 00	100 00
Rejected	0	0
% Rejected	0	0

Codes for Validated Data J, V

6.2.4 Sensitivity

Reporting limits, in units of micrograms per kilogram (ug/kg) for organics, were compared with RFCA WRW ALs Adequate sensitivities of analytical methods were attained for all COCs that affect remediation decisions "Adequate" sensitivity is defined as a reporting limit less than an analyte's associated AL, typically less than one-half the AL

6.3 Summary of Data Quality

The data collected and used for IHSS Group 500-5 are adequate for decision making

7.0 REFERENCES

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K-H, 2002c, V&V Guidelines for Volatile Organics, DA-SS01-v3, Rocky Flats Environmental Technology Site, Golden, Colorado, October

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Appendix A
Correspondence

Compact Disc Containing Normalized Real and Quality Control Data

ACCELERATED ACTION DATA

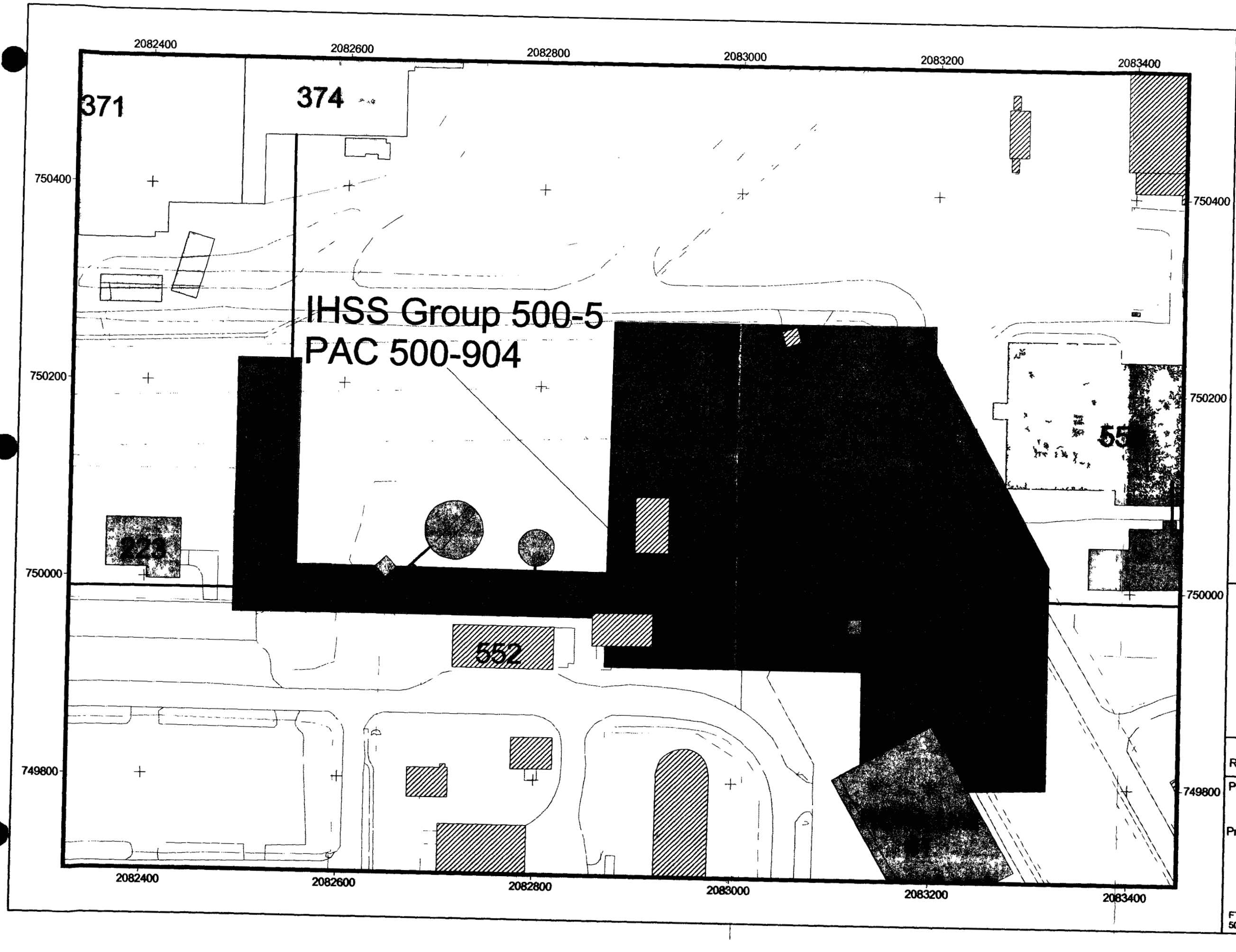

Figure 1
IHSS Group 500 5
PAC 500 904
Location

KEY

- PAC 500-904
- IHSS
- Demolished building
- Standing building
- NPWL
- Valve vault
- Paved road
- Dirt road
- Drainage
- Fence

DRAFT

20 0 20 40 60 80 100 120 Feet

Scale – 1 1100

State Plane Coordinate Projection
Colorado Central Zone
Datum NAD 27

U S Department of Energy
Rocky Flats Environmental Technology Site

Prepared by

Prepared for

KAISER•HILL COMPANY

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500-1 characterization apr

Date 04/09/04

Figure 2
IHSS Group 500-5
Historical Sampling Locations and Results

2082600 2082700 2082800 2082900 2083000 2083100 2083200 2083300

750300 750200 750100 750000 749900 749800

Location	Analyte	Result	Unit	Mdl	Wrw_al	Background
PCB-2-3 PCB-2-3	Aroclor 1260 Plutonium 239/240	360 000 0 243	ug/kg pCi/g	350 000 0 014	12400 50	NA 0 066

Location	Analyte	Result	Unit	Mdl	Wrw_al	Background
PCB-2 2 PCB-2 2 PCB-2 2	Americ um_241 Aroclor 1254 Pluton i m 239/240	0 252 1900 000 0 599	pCi/g ug/kg pCi/g	0 000 350 000 0 018	78 12400 50	0.023 NA 0 066

Location	Analyte	Result	Unit	Mdl	Wrw_al	Background
PCB-2-4 PCB-2-4	Aroclor 1254 Plutonium-239/240	9000 000 0 345	ug/kg pCi/g	350 000 0 008	12400 50	NA 0 066

Location	Analyte	Result	Unit	Mdl	Wrw_al	Background
PCB-2 1 PCB-2 1	Aroclor 1254 Plutonium-239/240	13000 000 0 330	ug/kg pCi/g	350 000 0 010	12400 50	NA 0 066

559

552

Location	Analyte	Result	Unit	Mdl	Wrw_al	Background
PCB-2-6 PCB-2-6	Aroclor 1254 Plutonium-239/240	55000 000 0 623	ug/kg pCi/g	350 000 0 000	12400 50	NA 0 066

Location	Analyte	Result	Unit	Mdl	Wrw_al	Background
PCB-2-5 PCB-2-5	Aroclor 1260 Plutonium-239/240	7200 000 0 247	ug/kg pCi/g	350 000 0 007	12400 50	NA 0 066

KEY

- Location with a WRW AL exceedance
- Location with no WRW AL exceedance
- IHSS
- Demolished building
- Standing building
- NPWL
- Valve vault
- Sewer line
- Paved road
- Dirt road
- Fence

DRAFT

w

20 0 20 40 60 80 Feet

Scale = 1 750

State Plane Coordinate Projection
Colorado Central Zone
Datum NAD 27

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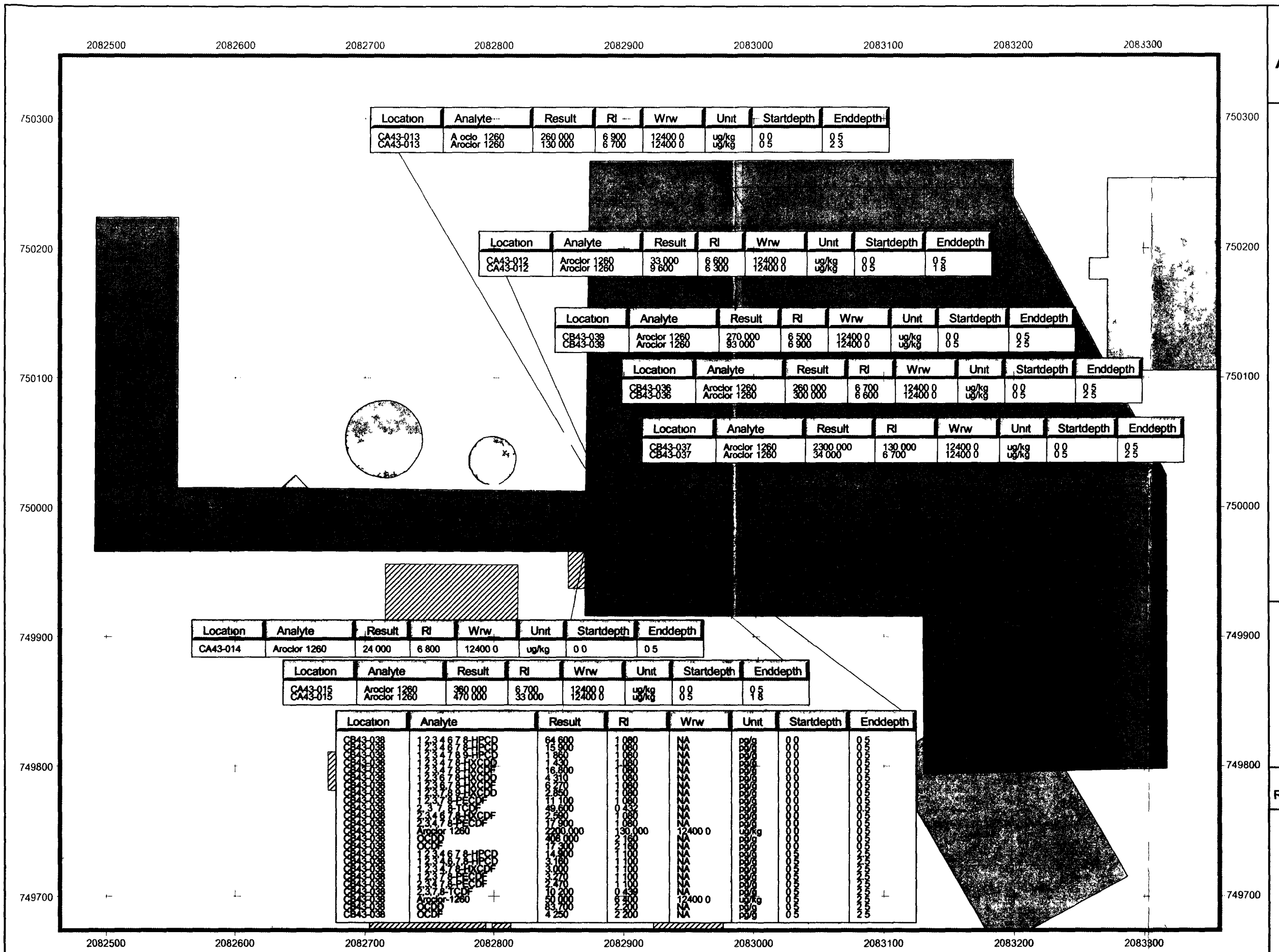
500-1 characterization apr

Date 04/09/04

Figure 3
IHSS Group 500 5
Accelerated Action Sampling Locations and Results



KEY

- Location with concentrations above RL and below WRW AL
- PAC
- IHSS
- Demolished building
- Standing building
- Dirt road
- Paved road

DRAFT

W

50 0 50 Feet

Scale = 1 900

State Plane Coordinate Projection
Colorado Central Zone
Datum NAD 27

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Rocky Flats Environmental Technology Site

Prepared by [redacted] Date 4 26 04

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